EMS Annual Meeting Abstracts
Vol. 10, EMS2013-520, 2013
13th EMS / 11th ECAM


# Statistical analysis and preliminary numerical forecast verification of global solar radiation in Croatia

I. Horvat, A. Bajić, D. Tomšić, Z. Žibrat, J. Kuzmić, K. Horvath, S. Ivatek-Šahdan, A. Stanešić, and T. Kovačić
Meteorological and Hydrological Service, Croatia

Studying and forecasting the global surface solar radiation is a very important issue for improving numerical weather prediction, especially evolution of the planetary boundary layer and clouds as well as for some aspects of renewable energy, architecture, agricultural industries and tourism. In the presented study, three-year records of 10-min mean global solar radiation (incident shortwave radiation) were (i) analyzed to assess the properties of surface global solar radiation (ii) used to study whether the accuracy of global solar radiation forecast improves with the mesoscale model resolution.

Measurements from seven automatic weather stations (AWS) located in continental (flat terrain) and costal (complex terrain) regions of Croatia were used for the study. A set of quality-control procedures was applied for assessing the measurement quality. Selected dataset was used for daily, monthly and yearly statistical analysis (i.e. averages, deviations, IQR, extremes etc.) and spectral analysis of global solar radiation. The same dataset was also used to evaluate forecasts of global solar radiation performed with the mesoscale model Aire Limitée Adaptation dynamique Développement InterNational (ALADIN). In particular, two model versions were used: (i) 8-km horizontal grid spacing version for 72h forecast range with 3-hourly temporal resolution of the output fields; (ii) 2-km horizontal grid spacing version for 24h forecast range with 1-hourly temporal resolution of the output fields. Verification and comparison between model forecasts at two different horizontal resolutions and measured data was based on the moment-based statistical verification and quantitative spectral verification, which enabled a detailed insight into scale-selective performance of the ALADIN model. Finally, we discuss differences found between solar radiation properties and model accuracy in flat continental and coastal complex terrain, and discuss major shortcomings which affect the model performance.